

**VI TELEFILTER****Filter specification****TFS140E****1/5****Measurement condition**

Ambient temperature: 23 °C  
 Input power level: 0 dBm  
 Terminating impedance: \*  
     Input: 860 Ω || -1.2 pF  
     Output: 860 Ω || -1,2 pF

**Characteristics****Remark:**

Reference level for the relative attenuation  $a_{rel}$  of the TFS140E is the minimum of the pass band attenuation  $a_{min}$ . The minimum of the pass band attenuation  $a_{min}$  is defined as the insertion loss  $a_e$ . The centre frequency  $f_C$  is the arithmetic mean value of the upper and lower frequencies at the 3 dB filter attenuation level relative to the insertion loss  $a_e$ . The nominal frequency  $f_N$  is fixed at 140,455 MHz without tolerance. The given values for the relative attenuation  $a_{rel}$  and for the group delay ripple have to be reached at the frequencies given below even if the centre frequency  $f_C$  is shifted due to the temperature coefficient of frequency  $TC_f$  in the operating temperature range and due to a production tolerance for the centre frequency  $f_C$ .

| <b>D a t a</b>                              |           | <b>typ. value</b>         | <b>tolerance / limit</b> |         |     |
|---------------------------------------------|-----------|---------------------------|--------------------------|---------|-----|
| <b>Insertion Loss</b>                       | $a_e$     | -                         | max.                     | 5       | dB  |
| (reference level)                           |           | -                         |                          | -       |     |
| <b>Nominal Frequency</b>                    | $f_N$     | -                         |                          | 140,455 | MHz |
| <b>Relative Attenuation</b>                 | $a_{rel}$ |                           |                          |         |     |
| $f_N \pm 25$ kHz                            |           | -                         | max.                     | 3       | dB  |
| $f_N \pm 75$ kHz ... $f_N \pm 125$ kHz      |           | -                         | min.                     | 8       | dB  |
| $f_N \pm 125$ kHz ... $f_N \pm 455$ kHz     |           | -                         | min.                     | 20      | dB  |
| $f_N \pm 455$ kHz                           |           | -                         | min.                     | 60      | dB  |
| <b>Intermodulation ****</b>                 |           | -                         | max.                     | -88     | dB  |
| <b>Input power</b>                          |           | -                         | max.                     | 5       | dBm |
| <b>Operating Temperature Range</b>          | OTR       | -                         | - 40 °C ... + 85 °C      |         |     |
| <b>Frequency Inversion Temperature</b>      |           | 25 °C                     | -                        |         |     |
| <b>Temperature Coefficient of Frequency</b> | $TC_f$ ** | -0,035 ppm/K <sup>2</sup> | -                        |         |     |
| <b>Storage Temperature Range</b>            |           | -                         | - 54 °C ... + 100 °C     |         |     |

\*) The terminating impedances depend on parasitics and q-values of matching elements and the board used, and are to be understood as reference values only. Should there be additional questions do not hesitate to ask for an application note or contact our design team.

\*\*)  $\Delta f_C(\text{Hz}) = TC_f(\text{ppm/K}) \times (T - T_0) \times f_{CAT}(\text{MHz})$

\*\*\*\*) For two – 20dBm input signals

@  $f_N + 0,060$  MHz and  $f_N + 0,120$  MHz

@  $f_N - 0,060$  MHz and  $f_N - 0,120$  MHz

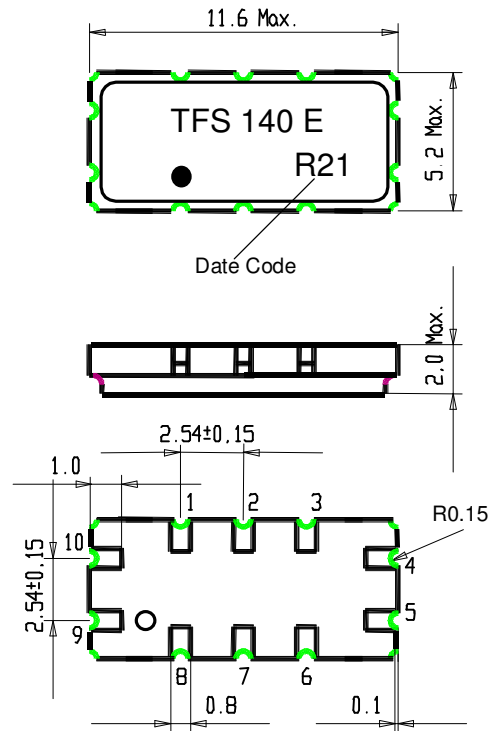
**Generated:****Checked / Approved:**

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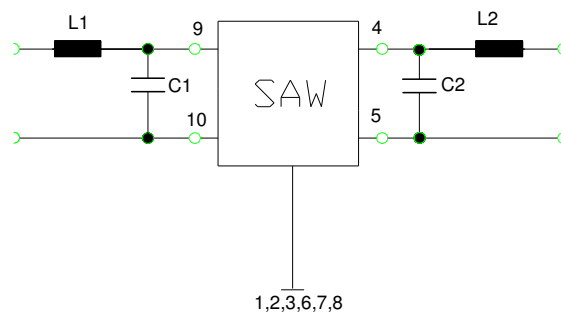
**Construction and Pin Configuration**

(All Dimensions in mm)



Pin 4 - Output  
 Pin 5 - Output RF Return  
 Pin 9 - Input  
 Pin 10 - Input RF Return  
 Pin 1,2,3,6,7,8 - Ground

Date code: year + week  
 N 2001  
 P 2002  
 R 2003  
 ...

**50  $\Omega$  matching circuit**

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**Stability Characteristics**

After the following tests the filter shall meet the whole specification:

1. Shock: 500g, 18 ms, half sine wave, 3 shocks each plane;  
DIN IEC 68 T2 - 27
2. Vibration: 10 Hz to 500 Hz, 0,35 mm or 5g respectively, 1 octave per min, 10 cycles per plan, 3 plans;  
DIN IEC 68 T2 - 6
3. Change of temperature: -55 °C to 125 °C / 30 min. each / 10 cycles  
DIN IEC 68 part 2 – 14 Test N
4. Resistance to solder heat (reflow): reflow possible: twice max.;  
for temperature conditions, please refer to the attached "Air reflow temperature conditions" on page 4;

**Packing**

Tape & Reel: DIN IEC 286 – 3, with exception of value for N and minimum bending radius;  
tape type II, embossed carrier tape with top cover tape on the upper side;

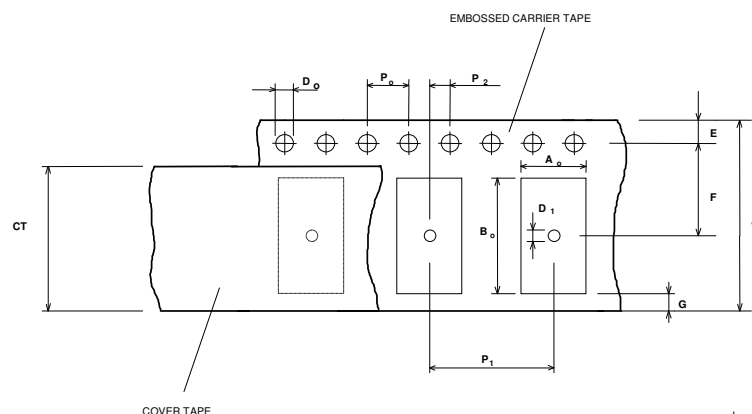
max. pieces of filters per reel:  
reel of empty components at start:  
reel of empty components at start including leader:  
trailer

3000  
min 300 mm  
min 500 mm

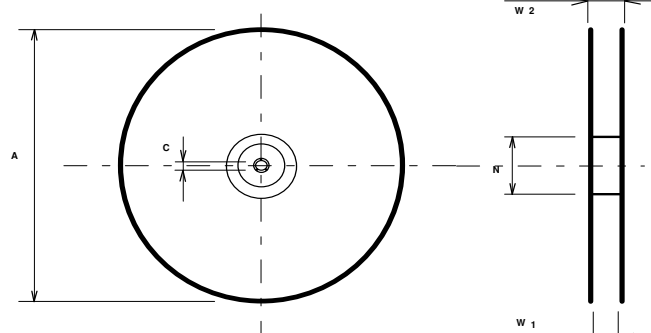
min 300 mm

**Tape (all dimensions in mm)**

|         |              |
|---------|--------------|
| W       | : 24 ± 0,3   |
| Po      | : 4 ± 0,1    |
| Do      | : 1,5 ± 0,1  |
| E       | : 1,75 ± 0,1 |
| F       | : 7,5 ± 0,1  |
| G (min) | : 0,6        |
| P2      | : 2 ± 0,1    |
| P1      | : 8 ± 0,1    |
| D1(min) | : 1,5        |
| Ao      | : 5,6 ± 0,1  |
| Bo      | : 11,8 ± 0,1 |
| CT      | : 21,5 ± 0,1 |

**Reel (all dimensions in mm):**

|          |                |
|----------|----------------|
| A        | : 330          |
| W1       | : 24,4 +2      |
| W2 (max) | : 30,4         |
| N (min)  | : 60           |
| C        | : 13 +0,5/-0,2 |



The minimum bending radius is 45 mm. The mounting surface of the filters faces the bottom side of the embossed carrier tape. Markings on the filters can be read if the upper side of the carrier tape is regarded with the sprocket holes on its right.

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**Air reflow temperature conditions**

1st and 2nd air reflow profile

|                     |                     |                      |                  |
|---------------------|---------------------|----------------------|------------------|
| <b>Name:</b>        | pre-heating periods | main-heating periods | peak temperature |
| <b>Temperature:</b> | 150 °C - 170 °C     | over 200 °C          | 255 °C ± 5 °C    |
| <b>Time:</b>        | 60 sec. - 90 sec.   | 20 sec. - 25 sec.    |                  |

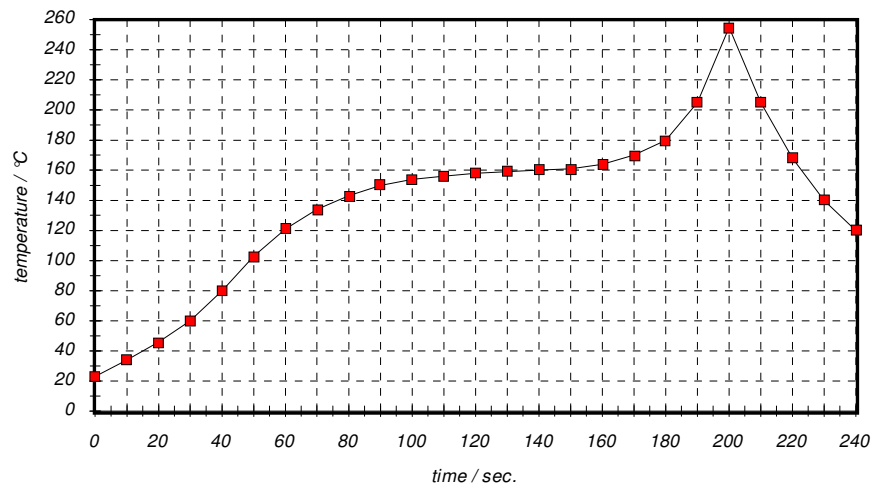
**Chip-mount air reflow profile**

Table for temperature vs. time during the air reflow process

Tolerance of temperatures: ± 5 °C

| time / sec. | temperature / °C | time / sec. | temperature / °C |
|-------------|------------------|-------------|------------------|
| 0           | 23               | 140         | 160              |
| 10          | 34               | 150         | 161              |
| 20          | 46               | 160         | 164              |
| 30          | 60               | 170         | 170              |
| 40          | 80               | 180         | 180              |
| 50          | 103              | 190         | 205              |
| 60          | 121              | 195         | 230              |
| 70          | 134              | 200         | 255              |
| 80          | 143              | 205         | 230              |
| 90          | 150              | 210         | 205              |
| 100         | 154              | 215         | 180              |
| 110         | 156              | 220         | 165              |
| 120         | 158              | 230         | 140              |
| 130         | 159              | 240         | 120              |

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**VI TELEFILTER****Filter specification****TFS140E****5/5****History**

| <b>Version</b> | <b>Reason of Changes</b>                                                                                                                                                                                                                                                                    | <b>Name</b> | <b>Date</b> |
|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|-------------|
| 1.4            | <ul style="list-style-type: none"><li>- Add history</li><li>- Change date code from month to week.</li><li>- Change pin 1 marker from tft to a filled point.</li><li>- Change stability characteristics.</li><li>- Change packing information.</li><li>- Add maximum input power.</li></ul> | Dr. Wall    | 19.05.2003  |

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